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IS 3988 (1981): Guar Gum [PCD 12: Plastics]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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Indian Standard
SPECIFICATION FOR
GUAR GUM
(First Revision)

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NEW DELHI 110002

Indian Standard

SPECIFICATION FOR GUAR GUM

(*First Revision*)

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Indian Standard
SPECIFICATION FOR
GUAR GUM
(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 11 May 1981, after the draft finalized by the Adhesives Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

0.2 Guar gum is essentially a complex carbohydrate composed of galactose and mannose units. It is extensively used in adhesives, paper, textiles, mining, drilling, explosives and food industries. Guar gum is a seed gum developed originally to replace locust bean gum. Although both the gums are galacto-mannans, guar gum hydrates in cold water in wide pH range. When present in traces it has excellent flocculating properties. It is also used as a filter aid. Treated gums are not covered in this standard as they are tailor-made to suit specific industrial applications.

0.3 This standard was originally published in 1967 and covered three grades, namely :

Grade 1 — Crude gum

Grade 2 — Refined gum

Grade 3 — Edible gum

While revising this standard the Sectional Committee felt that designating edible guar gum as Grade 3 was an anomaly. The Committee further felt that formulation of Indian Standard Specification for edible gum may form the subject of a separate standard, to be formulated by the appropriate technical committee under the Agricultural and Food Products Division Council of ISI. This would also facilitate coverage of the edible grade material under statutory requirements and relevant legislation, if any.

0.3.1 Accordingly the Committee decided to revise the standard and re-designate the remaining two grades, crude and refined gum as types, which would be end-use oriented.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the requirements and methods of sampling and test for guar gum in splits and pulverized form.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given in IS : 3434-1965† shall apply.

3. TYPES

3.1 There shall be two types of guar gum as indicated below :

- a) *Type 1* — Crude gum, and
- b) *Type 2* — Refined gum

4. REQUIREMENTS

4.1 Description — The material shall be obtained from guar seeds harvested from guar pods of *Cyamopsis tetragonolobus*. The material shall be either in the form of splits or powder.

4.2 Colour and Appearance — The colour and appearance of the material shall be as agreed between the purchaser and supplier.

4.3 The material, when tested following the methods as prescribed shall comply with the requirements given in Table 1.

4.4 For Pulverized Material Only

4.4.1 Residue on Sieve — Unless otherwise agreed, the material shall not leave residue more than 0.5 percent by mass when sieved through 125 micron size [see IS : 460 (Part I)-1978‡].

*Rules for rounding off numerical values (*revised*).

†Glossary of terms for adhesives and pressure sensitive adhesive tapes.

‡Specification for test sieves : Part I Wire cloth sieves (*second revision*)

TABLE 1 REQUIREMENTS FOR GUAR GUM

(Clause 4.3)

SL No.	CHARACTERISTIC	REQUIREMENT		METHODS OF TEST, REF TO CL NO. IN	
		Type 1	Type 2	Appendix IS : 7437-1974*	
(1)	(2)	(3)	(4)	(5)	(6)
i)	Moisture, percent by mass, <i>Max</i>	13.0	13.0	—	5
ii)	Ash, percent by mass, <i>Max</i>	1.5	1.0	—	6
iii)	Protein, percent by mass, (on dry basis), <i>Max</i>	9.0	5.0	—	16
iv)	Residue insoluble in acid, percent by mass, <i>Max</i>	14.0	7.0	A	—
v)	Gum, percent by mass, <i>Min</i>	65.0	75.0	—	22
vi)	Viscosity at 27°C, in centipoises, <i>Min</i>	1 000	2 500	B	—
vii)	pH	5.5 to 8	5.5 to 8	—	9

*Methods of sampling and test for vegetable adhesives.

4.4.2 Specks — The number of specks present in the guar gum shall be not more than that in the approved sample, when examined visually.

5. PACKING AND MARKING

5.1 Packing — Unless otherwise agreed between the purchaser and the supplier, the material shall be packed as follows:

- Splits, in single or double gunny bags, and
- Pulverized material in polyethylene bags placed in gunny bags or multiply kraft paper.

5.2 The packages shall be marked with the following information:

- Name, type and form of the material;
- Manufacturer's name and recognized trade-mark, if any;
- Month and year of manufacture;
- Mass of the material in the container; and
- Batch number.

5.2.1 The packages may also be marked with the Standard Mark.

NOTE — The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1936 and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

6. SAMPLING

6.1 Representative sample of the material for the purpose of testing shall be selected as prescribed in 4 of IS : 7437-1974*.

6.2 Criteria for Conformity

6.2.1 *For Individual Samples* — The lot shall be regarded as satisfying the requirement for viscosity if each of the individual samples satisfies the requirements for this characteristic.

6.2.2 *For Composite Sample* — The lot shall be regarded as satisfying the requirement for the remaining characteristics if all the test results on the composite sample satisfy the relevant requirements specified.

6.2.3 A lot shall be declared as conforming to the requirements of this standard if the requirements given in 6.2.1 and 6.2.2 are satisfied.

A P P E N D I X A

[*Table 1, Item (iv)*]

DETERMINATION OF RESIDUE INSOLUBLE IN ACID

A-1. REAGENTS

A-1.1 Dilute Sulphuric Acid — Dilute 2.6 ml of concentrated sulphuric acid (conforming to IS : 266-1977†) to 200 ml with water.

A-1.2 Kieselghur — Lavigated and calcined.

*Methods of sampling and test for vegetable adhesives.

†Specification for sulphuric acid (*second revision*).

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TO
IS:3988-1981 SPECIFICATION FOR GUAR GUM
(First Revision)

Alteration

(Page 6, clause 6.2 to 6.2.3) - Substitute the following for the existing clauses:

'6.2 Number of Tests and Criteria for Conformity

6.2.1 *Number of Tests* - All the characteristics shall be tested on the composite sample.

6.2.2 The lot shall be declared as satisfying the requirements of the specification if all the test results on the composite sample satisfy the relevant requirements specified.'

(PCDC 15)

A-2. PROCEDURE

A-2.1 Weigh accurately about 2 g of the material in a beaker. Add 150 ml of dilute sulphuric acid and stir the solution with a rubber-tipped glass rod. Cover the beaker with a watch glass and heat the mixture on a steam bath for six hours rubbing down the wall of the beaker frequently with rubber-tipped glass rod and replacing the water lost by evaporation. At the end of six hour heating period add about 500 mg of kieselghur, accurately weighed; and filter the solution through a tared gooch crucible provided with an asbestos pad. Wash the residue several times with hot water, dry the crucible and its contents at $105 \pm 2^\circ\text{C}$ for three hours. Cool in a desiccator and weigh. Repeat the operation till constant mass is obtained.

A-3. CALCULATION

$$\text{Residue insoluble in acid, percent by mass} = \frac{100 M_4 - (M_2 + M_3)}{M_1}$$

where

M_1 = mass in g of the gooch crucible with residue and kieselghur,

M_2 = mass in g of the dry gooch crucible with asbestos pad,

M_3 = mass in g of the kieselghur, and

M_4 = mass in g of the material taken for the test.

A P P E N D I X B

[Table 1, Sl No. (vi)]

DETERMINATION OF VISCOSITY**B-0. OUTLINE OF THE METHOD**

B-0.1 Viscosity of the solution is determined by Brookfield viscometer.

B-1. APPARATUS**B-1.1 Brookfield Viscometer****B-2. REAGENT****B-2.1 iso-Propyl Alcohol**

B-3. PROCEDURE

B-3.1 Weigh accurately 4.00 g of the material in a 600-ml beaker. Fix a stirrer and thermometer in it. Add 20 ml of isopropyl alcohol and mix it thoroughly so as to form a slurry. Add 400 ml of boiling water quickly while stirring the solution rapidly. If there are any lumps in the solution, discard and prepare the fresh solution until a clear solution is obtained. Cool and stir the solution until the temperature drops to 80°C. Place the beaker on a water-bath maintained at about 85°C and stir frequently for 10 minutes. Remove the beaker and place it in a water-bath maintained at $27 \pm 2^\circ\text{C}$. Stir the solution and add water so that the final weight of the beaker is 400 g more than the tare weight of the beaker. Adjust the temperature of the solution to $27 \pm 2^\circ\text{C}$ and measure its viscosity with Brookfield viscometer RVF model at 20 rev/min using spindle No. 3. Other viscometers may also be used provided they have been calibrated against Brookfield viscometer. Maintain the solution for 24 hours at $27 \pm 2^\circ\text{C}$ and again determine the viscosity at $27 \pm 2^\circ\text{C}$.

B-3.2 The limit prescribed in Table 1 shall be taken to have been satisfied if the viscosity of the solution both before and after 24 hours period is not less than the prescribed value.

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